Date: June 23, 1982

Subject: Primary Processes R & D
Monthly Report - June 1982

From/Location: E. L. Cambridge

To/Location: J. G. Kaufman

BASIC RESOURCES RESEARCH

Bauxite Evaluation Capability

All procedures for bauxite evaluation have now been identified and set up. A report documenting the procedure will be prepared.

AD-117 Impurity Leaching for Alumina

Having now established an acceptable method for analyzing P_2O_5 in alumina, all samples from previous experimental work were resubmitted for analysis. The results establish that acid leaching of alumina or raw clay fails to reduce P_2O_5 to acceptable levels. Therefore the postulated modifications to the Anaconda Alumina from Clay process are not viable. A final report is in preparation.

AD-120 Anaconda $AlCl_3$ Process

An interim technical report has been drafted for issue early in July.

A statistical study of five different treatments of ACH over the temperature range of 400°-750°C was initiated to provide a basis for evaluating the effect of ACH source and impurities on chlorination behavior.

Further experiments are being conducted on partial calcination of green coke to optimize the conditions for maximizing surface area and minimizing residual hydrogen.

Two draft patent applications were received from the patent attorney and reviewed. The final drafts should be available next week. Five more patent applications will be prepared.

REDUCTION RESEARCH

AD-108 Composite Anode Process

A new porous diaphragm design made of alumina was tested as a container for the powdered anode configuration. Increasing the static pressure between a graphite current collector and the powdered composite of alumina and crushed prebake carbon to 4 psi, gave a cell voltage of 4.3 at 0.75 amps/cm^2 current density. Although a significant improvement over previous results, this still does not meet our design goals. A similar experiment to verify these results

will be carried out using a mixture of alumina and carbon as the powdered composite.

Experiments are underway to establish the material balance for a 100 ampere composite anode cell. This balance will be used for scale-up design and further economic evaluation.

A new die for hot pressing prebaked composite anodes is being used successfully in a statistically designed set of experiments to optimize anode formulation with respect to conductivity and mechanical stability.

AD-116 Potlining Resource Recovery

A draft of the pre-phase one potlining recovery report was received from Alcan. Several discrepancies in economic analysis were noted and communicated to the writers. A second draft of the report is expected within a week. When the report is agreed upon, it will be submitted to management in each company.

Petroleum Pitch

Sam Jones attended a project review meeting in Louisville with Ashland representatives. Work to date was reviewed and methods of possibly upgrading Ashland pitch were discussed. Based on present results, R & D cannot recommend a plant test. We plan to carry out a complete evaluation procedure in September when our new lab is set up.

DEVELOPMENT AND TECHNICAL SERVICES

Pot Magnetics

The air-cooled shield for the magnetics probe was tested in a pot successfully at 28°C. The shops at Columbia Falls have finished the fabrication of the busbar pieces and the drilling of the bolt holes in the flexes. The first bus modification is still scheduled for July.

Lithium Fluoride Electrolyte

Subodh Das and Paul Russell made a presentation of their techno-economic assessment of lithium usage at Columbia Falls. Columbia Falls indicated no interest in changing their five-pot test plans but asked Tucson to assist in statistically determining the sample frequencies in support of the five-pot test.

Columbia Falls Anode Optimization

This project is underway and on schedule. Testing to determine the screen fractions to achieve optimum vibrated bulk density for Arco coke should be complete July 31, 1982.

Sebree Anode Optimization

A proposal written by Subodh Das and Sam Jones on Sebree Anode Optimization was issued. No formal response has been received from Sebree but indications are that the proposal was viewed favorably and a request for coke testing at Tucson is forthcoming.

Sebree 24-Day Anode Study

A preliminary feasibility report on the possible use of a 24-day anode set cycle at Sebree was completed by Paul Russell and will be issued this week. The study indicates that a 24-day anode operation would result in a $1.0 million annual saving in operating costs.

Continuous Pot Temperature Measurement

A project for the development of continuous bath temperature measurement was initiated. The first phase of testing will include the selection of a material which will withstand the pot environment. The full scope of the project will be written and issued the week of June 21.

Sebree Carbon Seminar

Sam Jones is now scheduled to hold his extensive carbon seminar at Sebree during the first week in October.

FACILITIES

We started moving in and setting up equipment in our new lab. This is still proceeding on schedule.

Preliminary plans for refurbishing two additional research labs were drawn up. Estimates will be obtained for AFE purposes.

PERSONNEL

Dave Moran attended the DuPont Experimental Design course to study statistically sound methods to achieve the most reliable experimental results for the least cost.

Subodh Das attended a one-week Interpersonal Awareness Seminar given by B. Karasick.

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ELC:pm

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